NOTE

The Species Commonality Index: A Method for Comparing Habitats

Ecologists have used a variety of methods for comparing habitats in order to point up their similarity and to predict the efficacy of transplants. Some methods are based upon what are believed to be outstanding physical differences and similarities between the habitats, while others are based upon faunal and floral similarities and differences. The following is a method based upon faunistic similarity.

For 3 years the writer has used a simple technique involving the number of species in common between two habitats in order to arrive at a single value for comparison. This number, the Species Commonality Index (SCI), is arrived at by dividing the number of species common to both habitats by the total number of species present, as shown in the following example.

HABITAT I	HABITAT II
Species Present	*Species Present*
A	A
B	B
C	C
L	L
M	N
O	P
R	Q
S	U
T	V
	W

Species in Common = 4

Total Number of Species = 15

$$\text{Species Commonality Index} = \frac{4}{15} = .27$$

In order to make even semivalid comparisons using this technique, the collections should be thorough and reasonably concurrent. The writer has found that a large group of interested students (for example a group of young biology majors), make very comprehensive collections. The following data were compiled by 30 students in an elementary ecology class at Western Washington College of Education during the months of March and April, 1960, and show to what purpose the SCI might be used.

From inspection of the data shown in Table 1, it is apparent that Whatcom Rapids and Bad Pond are least similar. One would expect a rapids area to bear little faunistic similarity to a pond habitat, and thus it is seen that whenever Whatcom Rapids is compared to a pond, the SCI is relatively quite low, except when compared with Mud Lake, and here is seen the third highest index. From this, it might be concluded that, ecologically, Whatcom Rapids is more similar to Mud Lake than to any other habitat shown, and thus, if no other information were available, it could be assumed that a transplant from the Rapids to Mud Lake might stand a fair chance of surviving.

Further inspection of the data shows that Lake Fragrance and Good Pond are ecologically most similar. This is surprising in view of the fact that the two habitats are separated by more than 50 mi. and lie at elevations differing by more than 1,000 ft. Good Pond and Bad Pond, however, lie less than 100 ft. apart, but, according to the SCI, they seem to be relatively quite different. The writer had assumed that the two bodies were connected until subsequent investigation spurred by the low SCI revealed complete separation. Lacking other information, the writer would stake more on a transplant being successful between Lake Fragrance and Good Pond than between Good Pond and Bad Pond —even though the latter two are adjacent. This opinion is supported somewhat by knowledge

TABLE 1

DATA COMPARING VARIOUS FRESH WATER HABITATS IN THE BELLINGHAM, WASHINGTON, AREA USING THE SPECIES COMMONALITY INDEX (SCI)

COMBINATION	TOTAL NO. SPECIES	NO. SPECIES IN COMMON	SCI
Whatcom Rapids Lake Fragrance	28	5	17
Good Pond Bad Pond	24	8	33
Bad Pond Peat Bog	18	9	50
Good Pond Peat Bog	19	6	32
Lake Fragrance Good Pond	22	12	55
Lake Fragrance Bad Pond	24	8	33
Lake Fragrance Peat Bog	23	7	30
Whatcom Rapids Mud Lake	28	11	39
Whatcom Pools Good Pond	23	8	35
Whatcom Pools Bad Pond	21	8	38
Whatcom Pools Peat Bog	21	8	38
Whatcom Rapids Good Pond	26	5	19
Whatcom Rapids Bad Pond	24	4	16
Whatcom Rapids Peat Bog	22	4	18
Fragrance Lake Mud Lake	24	10	42
Mud Lake Good Pond	24	9	37
Mud Lake Bad Pond	25	7	28
Mud Lake Peat Bog	24	7	29
Whatcom Pools Whatcom Rapids	24	9	38
Whatcom Pools Lake Fragrance	28	6	21
Whatcom Pools Mud Lake	27	6	22

common to fishermen in the locality, that trout stocking is much more successful in Good Pond than in Bad Pond—thus the names for the two ponds.

It should be emphasized that the method is useful only if:

1. *Thorough and complete collections are made.* It is obvious that the greater the number of species in common, the greater the similarity of niches, and the more similar the physical attributes to account for the species similarity. Thus, the more thorough the collection, the more valid the results.

2. *The collections are made as concurrently as possible.* This prevents seasonal variation from giving too low an index. If an index is desired which covers a longer period, then of course concurrent collections should be made over several seasons.

3. *Statements such as, "Mud Lake and Bad Pond are twice as dissimilar as are Lake Fragrance and Good Pond," are unwarranted.* It is certainly possible to have a zero SCI but for the habitats to have many similarities.

4. *The method is applied within limited areas where biotic communication between habitats is constantly possible and likely.* For example, it would be unrealistic to compare a pond in New Zealand with one in Washington by this method. Even though the physical attributes of the habitats might be very similar, there is no chance of obtaining a high index.

It is the writer's intention in the future to make more thorough collections of these same areas and of others, and to attempt relating the various indexes to the physical characteristics of the habitats.—*Charles J. Flora, Department of Biology, Western Washington College of Education, Bellingham, Washington.*